09/974,602

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to tape drive equipment aiming at maintenance of the data currently recorded on the magnetic tape, and a record medium.
[0002]
[Description of the Prior Art] In the same record area, the record medium it is made to have data logging performed only once is known. Since such a record medium is used as additional record or a record medium only for playbacks after it records, it is referred to as WORM (Write Once Read Many), for example. As this WORM, CD-R used as an optical disk, for example is known, and record of data is performed by forming a bit in the recording surface of a disk physically. Therefore, since it was unchangeable to the data currently recorded, it should excel in the maintainability of data.
[0003]
[Problem(s) to be Solved by the Invention] By the way, recently, the so-called tape streamer drive is spreading as drive equipment which can record / reproduce digital data at a magnetic tape. Although such a tape streamer drive is based also on the tape length of the tape cassette used as a record medium, it can have the huge storage capacity of dozens - about 100 G bytes of number, for example, and, for this reason, is widely used for the application of backing up the data recorded on media, such as a hard disk of the body of a computer. Moreover, also when using for preservation of image data with large data size etc., it is supposed that it is suitable. Moreover, since this magnetic tape is used as large capacity rather than CD-R and the unit price of the bit to the total storage capacity of a record medium can be made cheap, it considers using as a record medium of WORM which described the tape cassette above.
[0004] However, the data currently recorded on the magnetic tape may be eliminated by performing an operation mistake, where tape drive equipment is loaded with a tape cassette. Moreover, since the data currently recorded can be rewritten intentionally, there is a problem that it is not the thing excellent in the maintainability of important data.
[0005]
[Means for Solving the Problem] In order that this invention may solve such a trouble, when it is loaded with the tape cassette by which the magnetic tape was contained A tape drive means by which the informational record or the playback to said magnetic tape can be performed while making it run said magnetic tape, When it has the memory which records the management information for managing the record or playback to said magnetic tape of said tape cassette with which it was loaded A memory drive means by which necessary communications processing can be performed to the memory, and read-out or the writing of management information can be performed, An application identification information detection means to detect the application identification information which directs the application corresponding to said tape cassette from said memory, When a necessary action command is supplied, it has the control means which performs actuation to said magnetic tape based on said application identification information, and tape drive equipment is constituted.
[0006] Moreover, a tape drive means by which the informational record or the playback to said magnetic tape can be performed while making it run said magnetic tape when loaded with the tape cassette by which the magnetic tape was contained, When it has the memory which records the management

information for managing the record or playback to said magnetic tape of said tape cassette with which it was loaded A memory drive means by which necessary communications processing can be performed to the memory, and read-out or the writing of management information can be performed, The first identification information detection means which detects the identification information of said tape cassette memorized by said memory, The second identification information detection means which detects the identification information of said tape cassette memorized by said magnetic tape, It has an identification information distinction means to distinguish whether the identification information detected by the second identification information detection means is in agreement for a start [said], and the control means which can perform only specific actuation based on the distinction result of said identification information distinction means, and tape drive equipment is constituted.
[0007] Furthermore, in the record medium with which the tape cassette by which the magnetic tape was contained, and said tape cassette were equipped and which was equipped with the memory which records the management information for managing the record or playback to said magnetic tape, the application identification information which ** the application corresponding to said tape cassette in said memory is memorized.
[0008] Moreover, in the record medium with which the tape cassette by which the magnetic tape was contained, and said tape cassette were equipped and which was equipped with the memory which records the management information for managing the record or playback to said magnetic tape, the identification information of said tape cassette is memorized to said memory and said magnetic tape.
[0009] Since he is trying for the tape drive equipment of this invention to control the actuation to a tape cassette based on application identification information, it can be prevented from making the content of data change to record data to be saved, so that processing of elimination, overwrite, etc. may not be performed.
[0010] Moreover, only when the identification information of both a magnetic tape and memory is the same, it enables it to perform playback to a magnetic tape, and specific actuation of record. Thereby, a magnetic tape or memory can realize protection of record data to the exchanged tape cassette.
[0011] Moreover, since the application identification information which directs the application corresponding to a tape cassette to memory is memorized, the record medium of this invention can show the application of the record medium concerned to the tape drive equipment with which it was loaded.
[0012] Furthermore, since the identification information made into the serial number of a tape cassette etc. at memory and a magnetic tape is memorized, the memory and the magnetic tape with which the same tape cassette is equipped can be made to correspond. Thereby, with the drive equipment with which it was loaded, when the identification information detected from memory and a magnetic tape is not in agreement, record and playback actuation can be restrained.
[0013]
[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained. Here, although the various proposals of the invention about tape drive equipment (tape streamer drive) whose record/playback of digital data are enabled corresponding to the tape cassette by which nonvolatile memory was previously prepared by these people, and this tape cassette with memory were made, the gestalt of this operation should be applied to the data storage system which consists of a tape cassette with memory, and a tape streamer drive in this invention. Explanation is given in following sequence.
1. Motion control corresponding to DS 7.WORM of the data configuration 5.ID area 6. remote memory chip on the configuration 4. magnetic tape of a configuration 3. tape streamer drive of the configuration 2. remote memory chip of a tape cassette [0014] 1. -- **** of a tape cassette -- the tape cassette corresponding to the tape streamer drive of this example is first explained with reference to drawing 3 and drawing 4 . Drawing 3 (a) shows notionally the internal structure of the tape cassette by which the remote memory chip was allotted. Reel 2A and 2B are prepared in the interior of the tape cassette 1 shown in this drawing, and the magnetic tape 3 with a tape width of 8mm is looped around between this reel 2A and 2B. And the remote memory chip 4 which built in nonvolatile memory, its control circuit system, etc. is formed in this tape cassette 1. Moreover, this remote memory chip 4 has data transmission performed by the remote memory interface 30 and radiocommunication in the tape

streamer drive mentioned later, and the antenna 5 for it is formed. Although mentioned later in detail, the information relevant to the activity hysteresis of the manufacturing information and serial number information for every tape cassette, the thickness and die length of a tape, construction material, and the record data for every partition etc., User Information, etc. are memorized by the remote memory chip 4. In addition, on these descriptions, since the various information stored in the above-mentioned remote memory chip 4 is used mainly for various managements of the record/playback to a magnetic tape 3, it is made for these to also be collectively called "management information."

[0015] Thus, prepare nonvolatile memory in a tape cassette case, and that nonvolatile memory is made to memorize management information, and it has an interface for the store/read-out to nonvolatile memory in the tape streamer drive corresponding to this tape cassette, and record playback actuation to a magnetic tape 3 can be efficiently performed by performing read-out and the store of management information about the data-logging playback to a magnetic tape to nonvolatile memory. For example, even for example, the tape top does not need to rewind a magnetic tape in the case of loading/unloading, namely, loading and unloading can be made possible also in an intermediate location. Moreover, edit of data etc. can be performed by rewriting of the management information on nonvolatile memory. Furthermore, many partitions are set up more on a tape, and managing appropriately also becomes easy.

[0016] Moreover, drawing 3 (b) shows the tape cassette 1 by which the contact mold memory 104 (nonvolatile memory) was built in. In this case, five terminals 105A, 105B, 105C, 105D, and 105E are drawn, and it consists of modules of the contact mold memory 104 as a power supply terminal, a data input terminal, a clock input terminal, a grounding terminal, a reserve terminal, etc., respectively. As data in this contact mold memory 104, the same management information as the above-mentioned remote memory chip 4 is memorized.

[0017] In addition, when subsequent explanation shows the both sides of the remote memory chip 4 and the contact mold memory 104, it is made Media Interface Connector (Memory In Cassette).

[0018] It is the same as that of the configuration and basic target of a tape cassette which drawing 4 has the example of an appearance of drawing 3 (a) or the tape cassette 1 of (b) shown, and the whole housing consists of upside case 6a, bottom case 6b, and a guard panel 8, and are used for the usual 8mm VTR.

[0019] The terminal area 106 is formed near the label side 9 of the side face of this tape cassette 1. This is made into the part where an electrode terminal is arranged in the tape cassette of the type which contained the contact mold memory 104 of drawing 3 (b), and the terminal pins 106A, 106B, 106C, 106D, and 106E are formed. And these terminals pin is connected with each terminals 105A, 105B, 105C, 105D, and 105E shown in above-mentioned drawing 3 (b) 2, respectively. That is, the tape cassette 1 which has the contact mold memory 104 shall contact physically between tape streamer drives through the above-mentioned terminal pins 106A, 106B, 106C, 106D, and 106E, and it shall be carried out in mutual transmission of a data signal etc.

[0020] By the type which, on the other hand, contains the non-contact remote memory chip 4 like drawing 3 (a), though natural, a terminal pin becomes unnecessary. However, in order to become like drawing 4 as an appearance configuration, that is, to maintain the compatibility of the tape cassette configuration over equipment, the dummy terminal area 106 is formed. Moreover, although not illustrated, the remote memory chip of the non-contact mold formed in the shape of a label is also known. The label with which the remote memory chip is formed should be stuck in the necessary location of tape cassette 1 ****** at this. Thereby, when the tape streamer drive 10 is loaded with the tape cassette 1, the memory drive means of a remote memory chip and a tape streamer drive can communicate.

[0021] 2. The internal configuration of the configuration remote memory chip 4 of a remote memory chip is shown in drawing 5 . For example, the remote memory chip 4 shall have power circuit 4a, RF processing section 4b, controller 4c, and EEP-ROM4d, as shown in drawing 5 as a semiconductor IC. And on the printed circuit board fixed to the interior of the tape cassette 1, such a remote memory chip 4 is considered as mounting, and forms an antenna 5 in the copper foil part on a printed circuit board, for example.

[0022] This remote memory chip 4 is considered as the configuration which receives an electric power supply from the exterior in non-contact. The communication link between the tape streamer drives 10 mentioned later is receiving the electric wave from the tape streamer drive 10 with an antenna 5, although the subcarrier of for example, a 13MHz band is used, and power circuit 4a changes the subcarrier of a 13MHz band into direct current power. And RF processing section 4b, controller 4c, and EEP-ROM4d are supplied by using the direct current power as a power source of operation.
[0023] RF processing section 4b modulates information which the received information restores to which and transmits. Controller 4c carries out execution control of the processing according to the information (command) by which the input signal from RF processing section 4b was decoded and decoded, for example, a store, read-out processing, etc. to EEP-ROM4d. That is, the remote memory chip 4 will be in a power-on condition by the electric wave from the tape streamer drive 10 or library equipment 50 being received, and controller 4c performs processing directed by the command on which the subcarrier was overlapped, and manages data of EEP-ROM4d which is nonvolatile memory.
[0024] 3. Drawing 1 explains the configuration of the tape streamer drive 10 corresponding to the tape cassette 1 which carried the remote memory chip 4 shown at drawing 3 (a) to style Shigeji of a tape streamer drive. It is made for this tape streamer drive 10 to have record/playback performed by the helical scan to the magnetic tape 3 of the above-mentioned tape cassette 1. In this drawing, two recording heads 12A and 12B and the three reproducing heads 13A, 13B, and 13C are formed in a rotating drum 11. Recording heads 12A and 12B have the structure where two gaps from which an azimuth angle differs mutually reach to an extreme, and are arranged by approaching. The reproducing heads 13A, 13B, and 13B are also used as a predetermined azimuth angle, respectively.
[0025] While a rotating drum 11 rotates by drum motor 14A, the magnetic tape 3 pulled out from the tape cassette 1 is twisted. Moreover, a magnetic tape 3 is sent by capstan motor 14B and the pinch roller which is not illustrated. Moreover, although reel 2A and 2B are looped around the magnetic tape 3 as mentioned above, it rotates reel 2A and 2B to the forward direction and hard flow with reel motors 14C and 14D, respectively. Loading motor 14E drives the loading device which is not illustrated, and performs loading/unloading to the rotating drum 11 of a magnetic tape 3. The ejection motor 28 is a motor which drives the feeder style of the tape cassette 1, and performs taking a seat of the inserted tape cassette 1, and blowdown actuation of the tape cassette 1.
[0026] Revolution actuation of drum motor 14A, capstan motor 14B, reel motors 14C and 14D, loading motor 14E, and the ejection motor 28 is carried out by the power application from MEKADORAIBA 17, respectively. MEKADORAIBA 17 drives each motor based on the control from the servo controller 16. The servo controller 16 performs rotational-speed control of each motor, and performs tape transit at the time of the transit and the high-speed playback at the time of the usual record playback, rapid traverse, tape transit at the time of rewinding, etc. In addition, the constant which the servo controller 16 uses for the servo control of each motor is stored in EEP-ROM18.
[0027] In order that the servo controller 16 may perform servo control of each motor, FG (frequency generator) is prepared in drum motor 14A, capstan motor 14B, T reel motor 14C, and S reel motor 14D, respectively, and it enables it to detect the revolution information on each motor. Namely, drum FG29A which generates the frequency pulse which synchronized with the revolution of drum motor 14A, Capstan FG29B which generates the frequency pulse which synchronized with the revolution of capstan motor 14B, T reel FG29C which generates the frequency pulse which synchronized with the revolution of T reel motor 14C, and S reel FG29D which generates the frequency pulse which synchronized with the revolution of S reel motor 14D are formed, and these outputs (FG pulse) are supplied to the servo controller 16.
[0028] By the servo controller 16 distinguishing the rotational speed of each motor based on these FG pulses, an error with the rotational speed made into the object about revolution actuation of each motor can be detected, and rotational-speed control by the closed loop can be realized by performing impression power control equivalent to a part for the error to MEKADORAIBA 17. Therefore, at the time of various actuation, such as the usual transit at the time of record/playback, and a high-speed search, a rapid traverse, rewinding, the servo controller 16 is controllable so that each motor rotates with

the target rotational speed according to each actuation. Moreover, the servo controller 16 is connected at the system controller 15 and both directions which perform control processing of the whole system through an interface controller / ECC FOMATA 22 (henceforth IF / ECC controller).
[0029] SCSI interface 20 is used for I/O of data in this tape streamer drive 10. For example, at the time of data logging, data are serially inputted through SCSI interface 20 from a host computer 40 by transmission data unit called a fixed-length record (record), and compression/expanding circuit 21 is supplied through the SCSI buffer controller 26. It is made for the SCSI buffer controller 26 to have the data transfer of SCSI interface 20 controlled. In order to obtain the transfer rate of SCSI interface 20, let SCSI buffer memory 27 be the buffer means which it has corresponding to the SCSI buffer controller 26. Moreover, the SCSI buffer controller 26 also performs generation of the clock of operation to the remote memory interface 30 while supplying necessary command data to the remote memory interface 30 mentioned later. In addition, in such a tape streamer drive system, the mode in which data are transmitted from a host computer 40 by the variable-length data aggregate unit also exists.
[0030] In compression/expanding circuit 21, if there is need about the inputted data, compression processing will be made to be performed by the predetermined method. If a compression method for example, with LZ sign is adopted as an example of a compression method, in this method, to the character string processed in the past, the code of dedication divides, is given and is stored in the form of a dictionary. And the character string inputted henceforth is compared with the content of the dictionary, and if the character string of input data is in agreement with the code of a dictionary, these character-string data will be transposed to the code of a dictionary. A new code is given serially and the data of the input string which was not in agreement with the dictionary are registered into the dictionary. Thus, the data of an input string are registered into a dictionary and it is made to be carried out in a data compression by transposing character-string data to the code of a dictionary.
[0031] Although the output of compression/expanding circuit 21 is supplied to IF / ECC controller 22, it once accumulates the output of compression/expanding circuit 21 in buffer memory 23 by the control action in the IF/ECC controller 22. It is made for the data stored in this buffer memory 23 to have data treated as a fixed-length unit which is eventually equivalent to a part for 40 trucks of a magnetic tape called a group (Group) with control of the IF/ECC controller 22, and ECC format processing is performed to this data.
[0032] As ECC format processing, while adding an error correcting code about record data, modulation processing is performed about data and RF processing section 19 is supplied so that magnetic recording may be suited. In RF processing section 19, magnification, record equalizing, etc. are processed to the supplied record data, a record signal is generated, and recording heads 12A and 12B are supplied. Record of the data to a magnetic tape 3 will be performed from recording heads 12A and 12B by this.
[0033] Moreover, if data playback actuation is explained briefly, reading appearance of the record data of a magnetic tape 3 will be carried out by the reproducing heads 13A and 13B as an RF regenerative signal, and, as for the playback output, playback equalizing, playback clock generation, binary-izing, decoding (for example, Viterbi decoding), etc. will be performed in RF processing section 19. Thus, the signal by which reading appearance was carried out is supplied to the IF/ECC controller 22, and error correction processing etc. is performed first. And it is accumulated in buffer memory 23 temporarily, reading appearance is carried out at the predetermined event, and compression/expanding circuit 21 is supplied. In compression/expanding circuit 21, based on decision of a system controller 15, if it is data with which compression was performed by compression/expanding circuit 21 at the time of record, data decompression processing will be performed here, and if it is incompressible data, without performing data decompression processing, it will pass as it is and will be outputted. The output data of compression/expanding circuit 21 are outputted to a host computer 25 as playback data through the SCSI buffer controller 26 and SCSI interface 20.
[0034] Moreover, the remote memory chip 4 in the tape cassette 1 is shown in this drawing. To this remote memory chip 4, it is that a tape streamer drive is loaded with tape cassette 1 body, and will be in a system controller 15 and the condition which can output and input data in the state of non-contact through the remote memory interface 30.

[0035] The configuration of this remote memory interface 30 is shown in drawing 2 . A data interface 31 exchanges the data between system controllers 15. Although data transfer to the remote memory chip 4 is performed with the gestalt of the bitter taste knowledge from the remote memory chip 4 corresponding to the command from a device side, and it, in case a system controller 15 publishes a command to the remote memory chip 4, a data interface 31 receives command data and a clock from the SCSI buffer controller 26, so that it may mention later. And a data interface 31 supplies command data to the RF interface 32 based on a clock. Moreover, a data interface 31 supplies carrier frequency CR (13MHz) to the RF interface 32.

[0036] As shown in the RF interface 32 at drawing 2 , while carrying out amplitude modulation (100kHz) of the command (transmit data) WS and superimposing on carrier frequency CR, RF modulation / amplifying-circuit 32a which amplifies the modulating signal and is impressed to an antenna 33 are formed. Wireless transmission of the command data is carried out from an antenna 33 to the antenna 5 in the tape cassette 1 by this RF modulation / amplifying-circuit 32a. In the tape cassette 1 side, controller 4c operates according to the content which changed into the power-on condition by receiving command data with an antenna 5 by the configuration explained by drawing 5 , and was directed by the command. For example, the data transmitted with the write command are written in EEP-ROM4d.

[0037] Moreover, when a command is emitted from the remote memory interface 30 in this way, the remote memory chip 4 will emit the bitter taste knowledge corresponding to it. That is, controller 4c of the remote memory chip 4 makes the data as bitter taste knowledge modulate and amplify by RF processing section 4b, and carries out a transmitting output from an antenna 5. When such bitter taste knowledge is transmitted and it is received by the antenna 33, after being rectified by rectifier-circuit 32b of the RF interface 32, it restores to the input signal as data by comparator 32c. And a system controller 15 is supplied from a data interface 31. For example, when a read-out command is emitted from a system controller 15 to the remote memory chip 4, the remote memory chip 4 transmits the data read from EEP-ROM4d with the code as bitter taste knowledge according to it. Then, a reception recovery is carried out with the remote memory interface 30, and the bitter taste knowledge code and read data are supplied to a system controller 15.

[0038] As mentioned above, the tape streamer drive 10 is having the remote memory interface 30, and can be accessed to the remote memory chip 4 in the tape cassette 1. In addition, although the such non-contact data exchange superimposes data on the subcarrier of a 13MHz band by 100kHz amplitude modulation, the original data turn into packet-ized data. That is, a header, parity, and other required information are added to the data as a command or bitter taste knowledge, packet-ization is performed, and it enables it to transmit and receive as a stable RF signal in becoming irregular after carrying out code conversion of the packet. In addition, the technique of realizing such a non-contact interface is introduced as a technique by which these people applied previously and patent registration was carried out (patent No. 2550931).

[0039] The data with which a system controller 15 uses for various processings S-RAM24 shown in drawing 1 and a flash ROM 25 are memorized. For example, the constant used for control is memorized by the flash ROM 25. Moreover, S-RAM24 is used as work-piece memory, or let it be the memory used for storage, data processing, etc. of the data by which reading appearance was carried out from the remote memory chip 4, the data written in the remote memory chip 4, the mode data set up per tape cassette, various flag data, etc. In addition, S-RAM24 and a flash ROM 25 may be constituted as an internal memory of the microcomputer which constitutes a system controller 15, and are good also as a configuration using a part of field of buffer memory 23 as work-piece memory.

[0040] Although informational mutual transmission is performed using SCSI interface 20 as mentioned above between the tape streamer drive 10 and a host computer 40, to a system controller 15, a host computer 40 will perform various kinds of communication links using the SCSI command.

[0041] In addition, in order to perform store/read-out of data to the contact mold memory 104 in the tape cassette 1 as a configuration corresponding to the tape cassette which carried the contact mold memory 104 shown in drawing 3 (b), a necessary connector area (not shown) is prepared. This connector is made

into the configuration which suited the terminal area 106 shown in drawing 4 , and five terminals 105A, 105B, 105C, 105D, and 105E and system controllers 15 (port for memory connection of a system controller) of the contact mold memory 104 are electrically connected by connecting with a terminal area 106. This enables it to carry out direct access of the system controller 15 to the contact mold memory 104 of the tape cassette 1 with which it was loaded.
[0042] 4. Explain roughly the data format on a magnetic tape 3 of the tape cassette 1 to which record playback is performed by the data configuration, next the tape streamer drive 10 mentioned above on a magnetic tape.
[0043] Drawing 6 shows the structure of the data recorded on a magnetic tape 3. One magnetic tape 3 is typically shown in drawing 6 (a). In this example, like drawing 6 (a), one magnetic tape 3 shall be divided per partition (Partition), it shall be used, and it is supposed that it is possible to set up and manage the number of partitions of a maximum of 256 in the case of the system of this example. moreover, each partition shown in this drawing -- respectively -- partition #0, #1, #2, and #3 -- a partition number is given and managed as described as ...
[0044] Therefore, although it is possible to perform record/playback of data independently for every partition in this example, respectively, the record unit of the data in 1 partition shown, for example in drawing 6 (b) can be divided into the fixed-length unit called group (Group) who shows drawing 6 (c), and record over a magnetic tape 3 is performed by the unit for every group of this. In this case, one group corresponds to the amount of data of 20 frames (Frame), and as shown in drawing 6 (d), one frame is formed by two trucks (Track). In this case, let two trucks which form one frame be the trucks of the plus azimuth which adjoins each other mutually, and a minus azimuth. Therefore, one group will be formed by 40 trucks.
[0045] Moreover, the structure of the data for one truck shown in drawing 6 (d) is shown in drawing 7 (a) and drawing 7 (b). The DS of a block (Block) unit is shown in drawing 7 (a). 1 block is formed from parity area A3 for error corrections which consists of 2 bytes for 6 bytes of ID area A2 and ID data which are used for a search etc. following 1 byte of SYNC data area A1, and 64 bytes of data area A4. He is trying to record the cartridge serial number as identification information of the tape cassette 1 memorized by the remote memory chip 4 on data area A4 with record data with the gestalt of this operation at the time of record in case the application of the tape cassette 1 is set to "WORM" so that it may mention later. Thereby, the remote memory chip 4 and a magnetic tape 3 can be made to correspond in the tape cassette 1 now.
[0046] The data for one truck shown in drawing 7 (b) are formed by total of 471 blocks, as shown in drawing, the margin area A11 and A19 for 4 blocks is established in ends, and, as for one truck, the ATF area A12 and A18 for tracking control is formed the back of these margins area A11, and before a margin A19. Furthermore, in front of the back of the AFT area A12, and the ATF area A18, it has the parity area A13 and A17. The field for 32 blocks is prepared as such parity area A13 and A17.
[0047] Moreover, the ATF area A15 is formed to the medium of one truck, and the field for 5 blocks is prepared as these ATF(s) area A13, A15, and A18. And the data areas A14 and A16 for 192 blocks are formed between the ATF area A15 and the parity area A17 between the parity area A13 and the ATF area A15, respectively. therefore, all the data areas in 1 truck (A14 and A16) -- all -- 192x2=384 block will be occupied among 471 blocks. And as the above-mentioned truck is shown in drawing 7 (c) to a magnetic tape 3 top, it will be recorded physically, and it will be made into one group by 40 trucks (= 20 frames) as mentioned above.
[0048] Data logging will be performed by the area structure shown in the magnetic tape 3 explained by drawing 6 and drawing 7 at drawing 8 . In addition, the example by which N individual formation is carried out by a partition carrying out to to #0-#N-1 here is given.
[0049] As shown in drawing 8 (a), into the part of the beginning of a magnetic tape, physically, the leader tape is located in a head and the device area used as the field which performs loading/unloading of a tape cassette next is prepared. Let the head of this device area be the head location PBOT of a physical tape (Phisycal Begining of Tape). If the above-mentioned device area is followed, the system area (henceforth a system area including reference area) in which the reference area about partition #0,

the activity hysteresis information on a tape, etc. are stored is prepared, and a data area is prepared henceforth. The head of a system area is the starting position LBOT of a logical tape (Logical Begining of Tape). It is carried out.
[0050] Reference area, position tolerance band NO.1, a system preamble, a system log, a system postamble, position tolerance band NO.2, and a vendor group preamble are formed in this system area so that it may expand to drawing 8 (c) and may be shown.
[0051] As it expands to drawing 8 (b) and the data area following such a system area is shown, the group whom it was prepared, and the vendor group to whom the information about the vendor which creates and supplies data first is shown showed continuously to drawing 6 (c) will be formed in succession two or more, as shown as a group 1 - a group (n) here. And an AMBURU frame is allotted after the last group (n).
[0052] The field of EOD (End of Data) which shows termination of the data area of a partition is prepared like drawing 8 (a) following such a data area. Since it is the example in which the partition of N individual is formed in this case although the last of that EOD of partition #0 is made into the termination location LEOT of a logical tape (Logical End of Tape) when a partition is formed only for one, optional device area is formed following EOD of partition #0. Although the device area from the above-mentioned head location PBOT turns into area which performs loading/unload corresponding to partition #0, the optional device area of the last of partition #0 turns into area which performs loading/unload corresponding to partition #1. Moreover, it enables it to choose the device area or optional device area as a blowdown management domain as arbitration based on blowdown positional information in this example, so that it may mention later. That is, the unload in the location for which it asks is made possible.
[0053] The optional device area used as the area which area is constituted like partition #0 as partition #1, and performs loading/unload corresponding to the following partition #2 at the last is formed. Henceforth, even partition # (N-1) is formed similarly. In addition, in last partition # (N-1), since optional device area is unnecessary, it is not formed, but let the last of EOD of partition # (N-1) be the termination location LEOT of a logical tape (Logical End of Tape). PEOT (Phisycal End of Tape) The termination location of a physical tape or the physical termination location of a partition will be shown.
[0054] 5. Explain ID area, next the ID area A2 shown in drawing 7 (a) with reference to drawing 9 - drawing 11 . 39-bit ID information area (ID Information Area) where drawing 9 has the DS of the ID area A2 shown in, and this ID area A2 follows the 9-bit physical block address (Physical Block Address) A21 and this -- it consists of a field of A22.
[0055] As mentioned above, since all the data areas in 1 truck (A14 and A16) consist of 384 blocks, the number of the physical block addresses A21 contained in these all data area will also be set to 384. And an address value is given as the physical block address A21 of these 384 is incremented to 0-383 with a decimal-number-system expression sequentially from the physical block address A21 located in the head of one truck as typically shown in drawing 10 . Thereby, it is possible to treat the information on ID information area A22 included in the data area in 1 truck proper, and it is made by the record regenerative-apparatus side. Here, as data size of ID information area A22 included in the data area in 1 truck, it becomes 1872 bytes so that it may ask by 39(Bit) x384(Block) =14976(Bit) =1872 (Byte).
[0056] Drawing 11 is a total of 1872 bytes of ID information area A22 and A22 where each ID area information which the class of ID area information stored in ID information area A22 shown in drawing 9 shall be shown, and is shown in this drawing is included in the data area on 1 truck.... To a field, according to a predetermined regulation, it will be applied, and will be made and stored. Moreover, in consideration of making possible positive read-out of ID area information by the tape streamer drive 10, multiple-times record of the ID area information on the same class is carried out according to a predetermined regulation for every truck.
[0057] It sets to this drawing 11 and is the low format ID (Raw Format ID:16bit). The type of the fundamental format about a magnetic tape is shown, and when it is this example, information, such as construction material of a track pitch, the data size of one frame, the block count contained on one truck, the data size of 1 block, tape length, tape thickness, and a tape, is shown. Logical format ID (Logical

Format ID:8bit) The type of the record format used actually is shown. The logical frame ID (Logical Frame ID:8bit) consists of the last frame ID (Last Frame ID:1bit), the ECC frame ID (ECC Frame ID:1bit), and a logical frame number (Logical Frame Number:6bit), as shown in drawing. The last frame ID shows whether the present frame in which the ID area concerned is included is a frame of the last in a group, and the ECC frame ID shows whether the record data of the data area of the present frame are set to ECC (error correcting code).
[0058] Moreover, although one group consists of 20 frames as mentioned above, a logical frame number shows a frame of what position in the present group the frame concerned is.
[0059] The partition number of the partition with which Partition ID (Partition ID:16bit) contains the present frame is shown.
[0060] Area ID (Area ID:4bit) It shall be shown to which area the frame concerned belongs. Data ID (Data ID:4bit) The type of processing of data based on a record format is shown, and it is N-position (N-Position:4bit) and N-repeat (N-Repeats:4bit). The information about the data corresponding to a multiplex recording mode is defined. A group count (Group Count:24bit) shows the total of the group to the group in whom the frame concerned is contained in the present partition. Moreover, the total of the file mark with which a file mark count (File-Mark Count:32bit) is included even in the present group from the starting position in the present partition is shown. Let a file mark be the information which shows the break of the data file in 1 partition.
[0061] Save set mark count (Sava-Set Mark Count:32bit) In the present partition, the total of the file mark contained even in the present group from the starting position is shown. Let a save set mark count be the information which shows the break of the data save location in 1 partition. The total of the record with which a record count (Record Count:32bit) is contained even in the present group from the starting position in the present partition is shown. The total of the frame by which an absolute frame count (Absolute Frame Count:24bit) is included even in the present group from the starting position in the present partition is shown. Moreover, the field of the undefined (Reserved) is prepared in preparation for the addition of future ID area information etc. In addition, the number of bits given to the definition of ID area information and each ID area information which are shown in this drawing is an example, and may be changed according to a actual service condition.
[0062] 6. Explain the DS of a remote memory chip, next the DS of Media Interface Connector (the remote memory chip 4, contact mold memory 104) with which the tape cassette 1 is equipped. Drawing 12 is drawing showing an example of the structure of the data memorized by Media Interface Connector in ** type. The fields floor line1-floor line4 are set up as illustrated as a storage region of this Media Interface Connector. In these fields floor line1-floor line4, the various information at the time of manufacture of a tape cassette, the tape information at the time of initialization, the information for every partition, etc. are written in.
[0063] The field floor line 1 is made into a MANIFAKU char information (Manufacture Information), and let it be the manufacture PERT by whom the various information at the time of manufacture of a tape cassette is mainly memorized. The field floor line 2 is made into a memory management information (Memory Management Information), and let it be the drive initialization PERT by whom the information at the time of initialization etc. is mainly memorized. The field floor line 3 is used as a volume tag (Volume Tag), and the fundamental management information of the whole tape cassette is memorized.
[0064] The field floor line 4 is made into the field of a memory free pool, and let it be the field in which additional storage of management information is possible. According to the progress and the need for record playback actuation, various information is memorized to this memory free pool. In addition, the data constellation of one unit memorized to a memory free pool is considered as a "cel." partition information cel #0 which becomes the management information corresponding to each partition according to the partition formed in a magnetic tape 3 and #1 ... is written in one by one from the head side of a memory free pool. [first,] That is, a partition information cel is formed as a cel of the partition formed on the magnetic tape 3, and the same number.
[0065] Moreover, from the back end side of a memory free pool, super high speed search MAPPUSERU

(Super High Speed Search Map Cell) as map information for a high-speed search is written in. Moreover, a user volume note cel and a user partition note cel are continuously written in from a back end side. User volume note cels are information, such as a comment which the user inputted about the whole tape cassette, and user partition note cels are information, such as a comment which the user inputted about each partition. Therefore, these are not memorized when a user directs a store, and such information is not necessarily described altogether. Moreover, the middle field where such information is not memorized is left behind as a memory free pool for a next store.

[0066] The MANIFAKU char information of the field floor line 1 is made into structure as shown in drawing 13 . The information on the checksum to the data of this manufacture information is first stored in a manufacture information as a head manufacture PERT checksum (manufacture part checksum). The information on this manufacture PERT checksum is given at the time of cassette manufacture.

[0067] And from a Media Interface Connector type (mic type) to a write protect byte count (Write Protect byte count) is described as live data which constitute manufacture PERT. In addition, reserve (reserved) shows the field made into the reserve for prospective data storage. As for this, the same is said of subsequent explanation.

[0068] A Media Interface Connector type (mic type) is data in which the type of Media Interface Connector with which the tape cassette concerned is equipped actually is shown. As for a Media Interface Connector manufacture date (mic manufacture date), the date of manufacture (and time amount) of the Media Interface Connector concerned is shown. The information on a line name that the Media Interface Connector manufacture line name (mic manufacture line name) manufactured Media Interface Connector is shown. The information on a works name that the Media Interface Connector manufacture plant name (mic manufacture plant name) manufactured Media Interface Connector is shown. As for a Media Interface Connector MANYUFAKUCHUARA name (mic manufacturer name), the information on the manufacture company name of Media Interface Connector is shown. As for a Media Interface Connector name (mic name), the information on the vendor name of Media Interface Connector is shown.

[0069] Moreover, a cassette manufacture date (cassette manufacture date), A cassette manufacture line name (cassette manufacture line name), A cassette manufacture plant name (cassette manufacture plant name), The information about Media Interface Connector which described above the cassette MANYUFAKUCHUARA name (cassette manufacturer name) and the cassette name (cassette name), respectively, and the information on the same cassette itself are described.

[0070] As an OEM customer name (oem customer name), the information on the firm name of the phase hand of OEM (OriginalEquipment Manufactures) is stored. As physical tape character RISUTEKKU ID (physical tape characteristicID), the information on the properties of the physical magnetic tape 3, such as construction material of a tape, tape thickness, and tape length, is shown, for example. The information which shows the maximum clock frequency to which the Media Interface Connector concerned corresponds as maximum clock FURIKENSHI (maximum clock frequency) is stored. The information whether what byte of data can be transmitted by one communication link with the tape streamer drive 10, for example as a property of Media Interface Connector is shown by the block size (Block size). It shall depend for this information on the physical property of the nonvolatile memory used as a Media Interface Connector. As a Media Interface Connector capacity (mic capacity), the storage capacity information on the Media Interface Connector concerned is shown.

[0071] The write protect top address (write protect top address) is used in order to write-protect some [necessary] fields of Media Interface Connector, and it shows the starting address of a read only area. As for a write protect count (write protect count), the byte count of a read only area is shown. That is, the field occupied from the address specified in the above-mentioned write protect top address by the byte count shown by the field of this write protect count will be set up as a read only area.

[0072] The worm flag (worm flag) shown in the field floor line 11 shows "~~a general purpose~~", → normal "WORM", etc. as application identification information of the tape cassette 1. In addition, drawing 21 explains a worm flag in detail later.

[0073] Then, drawing 14 explains the structure of the memory management information of the field

floor line 2 of drawing 12 . The information on the checksum to the data of the memory management information made into this drive initialization PERT is first stored in a memory management information as a drive initialization PERT checksum (drive Initialize part checksum).
[0074] And the information from a Media Interface Connector logical format type (mic logical format type) to the free pool bottom product address (Free Pool Bottom Address) is described as live data which constitute a memory management information.
[0075] ID number of the logical format of Media Interface Connector is first stored as a Media Interface Connector logical format type (mic logical format type). As a Media Interface Connector format, for example besides a basic Media Interface Connector format, various existence of the format relevant to the renewal tape Media Interface Connector format of firmware, a reference tape Media Interface Connector format, a cleaning cassette Media Interface Connector format, etc. shall be recognized, and ID number according to a Media Interface Connector format of the tape cassette concerned will be shown.
[0076] The pointer which shows the start address of the field of super high speed search MAPPUSERU of drawing 12 to an absolute volume map pointer (absolute volume map pointer) is arranged. A user volume note cell pointer (user volume note cell pointer) shows the starting address of the user volume note cel which the user showed to the storage region which can write data freely, i.e., drawing 12 , via SCSI to a tape cassette. As for the user partition note cell pointer (user partition note cell pointer), the user shows the starting address of the storage region which can write data freely, i.e., the user partition note cel of drawing 12 , via SCSI to each partition. In addition, although two or more user partition note cels may be memorized, this user partition note cell pointer will show the starting address of the cel of the head of two or more user partition note cels.
[0077] A partition information cell pointer (partition informationcell pointer) shows the starting address of partition information cel #0 of drawing 12 . Although only the number of the partitions with which the partition information written in the memory free pool is formed in a magnetic tape 3 will be formed, all partition information cel #0 - #N is connected by link structure with the pointer. That is, a partition information cell pointer is made into the root which shows the address of partition #0, and the pointer of the partition information cel after it is arranged in the last partition information cel.
[0078] Each data location in the field floor line 4 is managed as mentioned above by each pointer (an absolute volume map pointer, a user volume note cell pointer, a user partition note cell pointer, partition information cell pointer).
[0079] Let the volume attribute flag (Volume Attribute Flags) be a flag for offering the logical write-protect tab to Media Interface Connector. That is, as a content which a Media Interface Connector header flag shows, it considers as write-in authorization / prohibition of a manufacture PERT part, or write-in authorization / prohibition of parts other than manufacture PERT.
[0080] The free pool top address (Free Pool Top Address) and the free pool bottom product address (Free Pool Bottom Address) show the starting address and ending address of a memory free pool in the event in the field floor line 2. Since the field as a memory free pool changes according to the store and elimination of a partition information, a user partition note, etc., according to it, the free pool top address and the free pool bottom product address are updated.
[0081] Then, drawing 15 explains the structure of the volume tag of the field floor line 3 of drawing 12 . The information on the checksum to the data of the volume information (Volume Information) where the fundamental management information of the whole tape cassette is memorized as a volume information checksum (Volume Information Checksum) at the head of a volume tag is stored. Furthermore, the information on the checksum to the data of the AKYUMUREITIBU partition information (Accumulative Partition Information) where the hysteresis information from the time of tape cassette manufacture is memorized is stored as an AKYUMUREITIBU partition information checksum (Accumulative Partition Information Checksum).
[0082] a volume note checksum (Volume note checksum) and a volume note (Volume note) -- then, the serial number by which a cartridge serial number (Cartridge Serial Number) is made the text of 32 characters based on an ASCII code is stored. As for Manufacture ID (Manufacturer ID), the code

number of the manufacturer of the tape cassette 1 is stored as a manufacturer identifier. Secondary ID (Secondary ID) is made into the secondary identifier according to the type of the tape cassette 1, for example, the attribute information on a tape is stored as code value. Let cartridge serial number PERT checksums (Cartridge Serial Number Part Checksum) be a cartridge serial number, Manufacture ID, and the checksum information on secondary ID. As for the SUPESHIFIKKU volume tag (Specific Volume Tag) 1 thru/or 13, each area is constituted as reserve.

[0083] Drawing 16 is drawing explaining the structure of the volume information floor line 31 of the volume tag floor line 3. As shown in drawing 16 (a), in a volume information, the information on the checksum to the data of this volume information is stored in 1 byte of head as a volume information checksum (Volume Information checksum). And the ejection status (Eject Status) of 20 bytes, the reel wound diameter (Reel Diameter) of 4 bytes, 3 bytes of initialization count (Initialize Count), and 72 bytes of volume information-on tape (Volume Information On Tape) are described as live data which constitute a volume information.

[0084] And the content of the volume information-on tape floor line 311 comes to be shown in drawing 16 (b). The volume information-on tape floor line 311 removes the field as reserve as illustrated. A 1-bit super high speed SACHIINEBURU flag (Super High Speed Search Enable Flag), A 2-bit system log allocation flag (System Log Allocation Flags), An all way ZUAN load PBOT flag (Always Unload PBOT Flags), A 1-bit AIT native flag (AIT Native Flag), 1 byte of last BARIDDOPATISHON number (Last Valid Partition Number), 32 bytes of optional DEBAISUERIA allocation map (Optional Device Area Allocation Map) is described.

[0085] Let a super high speed SACHIINEBURU flag be the flag which directs whether confirm the high-speed search function to the Normal search using the tape positional information stored as a super high speed search map of Media Interface Connector mentioned later. When this flag is set to "1", a high-speed search becomes effective. A system log allocation flag is made into the flag which shows where the activity hysteresis (system log) of a tape cassette is stored, for example, it enables it to identify whether or it is recorded only on the magnetic tape 3, and it is not recorded on a magnetic tape 3 and the both sides of Media Interface Connector, it is recorded on a magnetic tape 3 and the both sides of Media Interface Connector, or is recorded only on Media Interface Connector4.

[0086] Even if a multi-partition is formed in a magnetic tape 3 and an all way ZUAN load PBOT flag moreover has optional device area in a partition, it considers as the flag which directs to perform an unload in the device area in PBOT. Let an AIT native flag be the flag which shows the mode of the tape cassette 1. A RASUTOBA lid partition number shows the number of the partition of the last currently formed.

[0087] 1 bit supports each each of each partition which an optional device area map consists of 256 bits, and is formed on a magnetic tape 3. And when the value of a bit is set to "1", it is shown in the partition corresponding to the bit concerned that optional device area is formed.

[0088] Then, the cel memorized in the field floor line 4 shown in drawing 12 is explained. A partition information cel, a user partition note cel, super high speed search MAPPUSERU, etc. are remembered to have described above in the field floor line 4. The structure of each of these cels is shown in drawing 17 . One cel is formed from 8 bytes of link information, and n bytes (it changes with cel classification) of data, as shown in drawing 17 (a).

[0089] 8 bytes of link information is established in each cel, and the structure becomes like drawing 17 (b). As a checksum about the data in a cel, 1 byte of cel checksum (cell checksum) is prepared first. Moreover, the size of the cel is shown as cell size (cell size) of 2 bytes.

[0090] A previous cell pointer (previous cell pointer) and the NeXT cell pointer (next cell pointer) are actual linkage data (data which build link structure), and in case two or more cels of the same class are linked, the cel of order is specified with this previous cell pointer and a NEKUTO cell pointer.

[0091] As a cel of such structure, a partition information cel, super high speed search MAPPUSERU, a user volume note cel, and a user partition note cel exist. And in a partition information cel, cell size serves as a fixed value. In other cels, cell size serves as an adjustable value.

[0092] Drawing 18 and drawing 19 explain the partition information cel from which cell size serves as a

fixed value. A partition information cel is formed from 8 bytes of link information, and 56 bytes of data, as shown in drawing 18 . And 8 bytes of 56 bytes of data are considered as a partition memorandum, and let 48 bytes be a partition information.
[0093] The various information about the activity hysteresis over the magnetic tape 3 in the partition which corresponds that cel is stored in this partition information (system log), and a tape streamer drive is used as information for management of own record/playback actuation.
[0094] The DS of the partition information in one partition information cel corresponding to a certain partition is defined as shown in drawing 19 . It measures in 4 bytes of previous group RITUN (Previous Groups written) from the time of the partition information concerned being updated at the end, and the information on the group number in the partition concerned physically recorded to the magnetic tape 3 is shown in it. A group's total recorded to the partition concerned until now is shown in 4 bytes of total group RITUN (Total Groups written). this value -- for example, a tape cassette -- a life -- becoming -- activity impossible -- or it is integrated until disposal is carried out. To the magnetic tape 3, if it is in a condition while recording data, according to the group number newly recorded by the present record actuation, the increment of the value of the field will be carried out to these previous group RITUN and total group RITUN by for example, the tape streamer drive by processing of the system controller 15 of a tape streamer drive.
[0095] It measures in 3 bytes of previous group lead (Previous Groups read) from the time of the partition information concerned being updated at the end, and the group number to which read-out was performed physically is shown in it. The value by which the group number by which reading appearance was carried out more until now than the partition concerned was integrated is shown in 4 bytes of total group lead (Total Groups read).
[0096] 3 bytes of toe TARURIRI tone frame (Total Rewritten frames) has the value which integrated the frame number with which the demand of data re-writing was made based on RAW in the partition concerned shown.
[0097] The value by which the group number which performed the error correction using C3 parity in the partition concerned was integrated is shown by 3 bytes of total 3rdECC count (Total 3rd ECC count). Although it is made to perform an error correction by the parity of C1, C2, and C3 in the tape streamer drive system of this example about the data read from the magnetic tape 3, C3 parity is used only on C1 and C2 parity, when recovery of data is not able to be aimed at.
[0098] The count to which the tape streamer drive accessed the partition concerned on a magnetic tape 3 is shown by 4 bytes of access count (Access count). The count to which the count which passed the partition concerned physically [access here] was said to, that is, the record or playback to the partition was performed, and the passed count are also contained.
[0099] The information which integrated the count which rewrote data to the magnetic tape 3 in the partition concerned by update is shown in 4 bytes of update replacement count (Update Replace count). That is, it is a count of updating to the partition concerned.
[0100] It measures on 2 bytes of previous RIRITUN frame (Previous rewritten frames) from the time of the partition information concerned being updated at the end by RAW explained previously, and the information on the frame number in the partition with which the demand of data re-writing was made is shown in it.
[0101] It measures at 2 bytes of previous 3rdECC count (Previous 3rd ECC count) from the time of the partition information concerned being updated at the end, and the group number which performed the error correction using C3 parity is shown in it.
[0102] The value which integrated the count which loaded the tape is shown by 3 bytes of load count (Load count).
[0103] The information on the frame count to the last frame that 3 bytes of BARIDDOMAKISHIMAMU absolute frame number (Valid Maximum Absolute frame Number) is confirmed in the partition concerned is shown. On the other hand, as for 3 bytes of maximum absolute frame count (Maximum Absolute frame Number) of the last of a partition information, the information on the frame count of the last of the partition concerned is shown.

[0104] The content of a flag is defined as follows about each bit by 1 byte of partition attribute flag (Partiotion Attribute Flag). Namely, a pre vent light flag (Prevent Write Flag), The Pleven Toledo flag (Prevent Read Flag), As the Pleven TORAITO retry flag (Prevent Write Retry Flag) and a Pleven Toledo retry flag (Prevent Read Retry Flag) The flag which shows the write-in authorization / prohibition to the partition concerned, read-out authorization / prohibition and the re-write-in authorization / prohibition of data based on RAW at the time of record, authorization/prohibition of the retry of data read-out at the time of playback, and ********** is prepared. Moreover, as a partition opening closing flag (Partition Open Close Flag), it is set during the record over the partition concerned, and the flag reset according to record termination is prepared.
[0105] Thus, the remote memory chip 4 is constituted from the field floor line 1 by the storage region shown in the field floor line 4. By the way, if attached to each data item in the field floor line 1 shown in drawing 12 , it considers, for example as information which is not updated when the user uses the tape cassette, such as information on tape cassette 1 the very thing, and information on remote memory chip 4 the very thing. Moreover, about the worm flag (field floor line 11) which shows the application of the tape cassette 1, the content is wanted to be made not to be changed. Then, as a storage region of the remote memory chip 4, it is shown in drawing 20 (a). For example, it sets up as the ROM (Read Only Memory) field made read-only [the field floor line 1] and an RWM (Read Write Memory) field made possible [read-out/writing] for the fields floor line2-floor line4. A user can be prevented from changing about the data item stored in the field floor line 1 by this.
[0106] Moreover, the ROM field where the remote memory chip 4 is stored in the information on the field floor line 1, and the RWM field where the information on the fields floor line2-floor line4 is stored may consist of memory of another object as shown, for example in drawing 20 (b).
[0107] Furthermore, it can avoid carrying out except the write-in processing based on a necessary password by constituting all the storage regions of the remote memory chip 4 as an RWM field, and having the write-in control means which consists of a necessary logical circuit which performs write-in control about the field which memorizes the field floor line 1 as shown, for example in drawing 20 (c).
[0108] Or all the data of an RWM field are set to "1" (or "0") as an initial state of the remote memory chip 4. And a write-in control means makes this bit Bit alpha paying attention to the specific bit in the specific address in the field treated as a ROM field. In this case, to all the fields of an RWM field, i.e., all the fields of the remote memory chip 4, when Bit alpha is "1" (or "0"), a write-in control means makes write-in processing effective. Therefore, writing becomes possible also to the field treated as a ROM field. However, by setting Bit alpha to "0" (or "1"), a write-in control means can make invalid write-in processing to a ROM field.
[0109] Thus, a worm flag can be made now into effective information by preventing from changing the content of the data stored in the field floor line 1. Therefore, by rewriting a worm flag, it realizes and the thing of the constraint which becomes possible [using it only for the application which it also becomes impossible to perform alteration of the data recorded as "WORM", elimination, etc., and is set up beforehand] can be carried out.
[0110] Motion-control drawing 21 corresponding to 7. "WORM" is drawing which explains the worm flag as application identification information stored in the field floor line 11 of the remote memory chip 4 as an example in the gestalt of this operation. Although "2" and other examples are shown in this drawing from the application number "0", in the tape streamer drive 10, a limit will be added to record and playback actuation based on this application number. For example, when an application number is "0", the tape cassette 1 shall show that it is the record medium considered as a general purpose, and the constraint carried out to actuation in between shall not have it. That is, a user shows that it is the tape cassette 1 which can respond in activity eye and can be used freely, and an application number "0" performs actuation according to the various commands supplied from a host computer 40 based on actuation of a user in the tape streamer drive 10.
[0111] When an application number is "1", it is shown that it is the tape cassette 1 aiming at data distribution, renewal of a firmware, etc. In this case, the tape cassette 1 is identified as a thing only for playbacks. Therefore, even when the command in connection with the update process of the data

currently recorded considered as a format etc. from a host computer 40 is supplied, let the command be an invalid thing.
[0112] Moreover, when an application number is "2", it is shown that it is the tape cassette 1 aiming at WORM. In this case, in order to maintain the data currently recorded, it is related with record and only the record (additional record) which made the last record location in a partition the recording start location, for example is permitted. That is, the actuation which updates data already recorded, such as overwrite and elimination, for example will be forbidden. Therefore, only additional record or playback actuation is permitted to the tape cassette 1 by which the application number "2" is set up. Let the command in connection with the update process of the data currently recorded considered as a format etc. also in this case be an invalid thing.
[0113] Furthermore, when performing additional record in "WORM", as opposed to data area A4 of the block shown in drawing 7 (a), the cartridge serial number in the volume tag of drawing 15 is memorized. Therefore, the same information will be recorded on the tape cassette 1 to which the application is set as "WORM" to the remote memory chip 4 and a magnetic tape 3. By this, in the tape cassette 1, a response of the remote memory chip 4 and a magnetic tape 3 can be taken. Therefore, it becomes possible to restrain activation of playback actuation by collating the cartridge serial number memorized by the remote memory chip 4 and the magnetic tape 3. That is, the remote memory chip 4 of the tape cassette 1 set to "WORM" is exchanged, and since a cartridge serial number will not be in agreement when other remote memory chips 4 considered as "the general purpose" are attached, in such a case, the actuation in the tape streamer drive 10 can be restrained.
[0114] Furthermore, as for values other than the above "0", "1", and "2", an application number is considered as reserve. Therefore, in the tape streamer drive 10, it shifts to the standby condition for telling this purport to a host computer 40, for example, discharging the tape cassette 1 concerned noting that the application of the tape cassette 1 cannot be identified as tape streamer drive 10, when application numbers are values other than "0", "1", and "2." In addition, when the command made into an invalid when application numbers are "1" and "2" is supplied, the purport that the command concerned cannot be executed is told to a host computer 40, and it shifts to a blowdown standby condition.
[0115] Moreover, when referred to as "WORM", while memorizing a cartridge serial number to data area A4, you may make it record the information (for example, text of "WORM") which can identify being referred to as "WORM." Furthermore, when considering as "the general purpose" and recording, you may make it record identification information (text of "NORMAL") for it being data recorded for the application corresponding to "a general purpose." Thereby, the tape streamer drive 10 can obtain now the application identification information of the tape cassette 1 also from a magnetic tape 3. Therefore, the application of the tape cassette 1 can be distinguished now also in the condition that a worm flag cannot be obtained from the remote memory chip 4.
[0116] By the way, although the above-mentioned application number will be identified by the tape streamer drive 10 loaded with the tape cassette 1, it does not need to consist of tape streamer drives 10 so that an application number "0", "1", and "2" may not necessarily be recognized altogether. For example, what is necessary is just to shift to the standby condition for discharging the tape cassette 1 concerned, for example in the tape streamer drive 10 constituted so that only the tape cassette 1 considered as the general purpose can be used, even when it considers that it is necessary not to dare recognize WORM, for example, an application number "1" and "2" are detected. Moreover, what is necessary is just to consider as the configuration of data which can be reproduced at least as tape streamer drive 10 which can recognize an application number "1." Namely, what is necessary is just to enable it to recognize an application number "1" in the tape streamer drive 10 as drive equipment only for playbacks. Furthermore, in the tape streamer drive 10 to which recognizing an application number "0" and "1" is carried out, it can identify whether the tape cassette 1 with which it was loaded is general-purpose, or it is WORM, and a general-purpose application and the application aiming at the data maintenance set to WORM can be selectively responded now.
[0117] When, as for such an application number of a worm flag, a tape streamer drive is loaded with the

tape cassette 1, it is detected by control of a system controller 10 and various motion control of a tape streamer drive is performed after it based on an application number.

[0118] Drawing 21 is a flow chart explaining processing transition of the system controller 40 in case "WORM" records to the tape cassette 1 set up as an application with a worm flag. In addition, the flow chart shown in this drawing is processing transition in the condition that the worm flag which the tape streamer drive 10 was loaded with the tape cassette 1, and was detected from the remote memory chip 4 is set to "WORM."

[0119] It is in the condition that "WORM" is set up as an application of the tape cassette 1, for example, if a light command is supplied from a host computer 40 (S001), control which moves to the partition which records data first will be performed. Rapid-traverse playback is performed in this case (S002), and the partition ID of ID area currently recorded on the magnetic tape 3 explained by drawing 11 in this condition is detected (S003). This rapid-traverse playback is performed until the partition ID of the partition for which it asks is detected.

[0120] If the partition for which it asks by steps S002 and S003 is reached, it will shift to the processing which detects the frame of the last in the partition next. Here, an example of the calculation approach of the distance to the frame of the partition concerned specified at the maximum ABUSOYUTO frame count from the current position, i.e., the head location of the partition concerned, in the magnetic tape 3 is explained.

[0121] When distance from the current position to the location for which it asks is set to "L", it becomes L= maximum ABUSOYUTO frame count x {(linear track pitch) x2}. However, by this formula, since one frame assumes the format equivalent to a part for two trucks as shown in drawing 6 , the linear track pitch has been calculated as twice. and the relational expression made into the formula (1) distance L indicates thickness [of a magnetic tape 3] t, and the diameter of a reel hub (2A, 2B) to be below when the rotational frequency of phi and a reel hub (2A, 2B) is set to n -- it can ask. However, the information about thickness t of a magnetic tape 3 can be acquired from the physical character squirrel tick ID (drawing 13).

[Equation 1]

$$L = \frac{\pi\left(\frac{\phi}{2} + n\,t\right)^2 - \pi\left(\frac{\phi}{2}\right)^2}{t} \qquad \cdots\cdots (1)$$

In addition, the 2nd term of a molecule which the 1st term of a molecule shown in the right-hand side in this formula (1) shows the same to either reel hub 2A or 2B again at the right-hand side corresponds to reel hub 2A, or any of 2B or another side, and shows the area of the magnetic tape 3 around which each reel hub is looped.

[0122] By such formula (1), if reel hub 2A and 2B are what rotated, it can ask for whether the frame corresponding to a maximum absolute frame count is reached. Therefore, a magnetic tape 3 can be carried forward to a target location by performing rapid-traverse actuation until FG pulse number currently outputted from the present reel 29C and FG 29D turns into reel hub 2A called for by the formula (1), and a number corresponding to the rotational frequency n of 2B.

[0123] Thus, the value of a maximum absolute frame count is converted into the pulse number of Reel 29C and FG 29D (S004), and control which makes it run a magnetic tape 3 by rapid-traverse control is performed (S005). When FG pulse number detected with this rapid-traverse actuation is compared with the pulse number computed at step S004 and both pulse numbers are in agreement, it means arriving at the location corresponding to the value of a maximum ABUSOYUTO frame count. And record of data is started from the location (S007). Thus, it can move to the non-recorded area on a magnetic tape 3 by passing through steps S004 and S005, and the data already recorded by starting record from this location can perform additional record of new data, without being changed. In addition, additional record can be performed, without eliminating the data already recorded by considering as the origin of record of the location corresponding to this maximum ABUSOYUTO frame count, since a maximum ABUSOYUTO

frame count is also updated according to the data volume recorded by performing this additional record.
[0124] Moreover, when performing additional record of data in step S007, a cartridge serial number is memorized to data area A3 of the block shown in drawing 7 (a) with record data. Thereby, the remote memory chip 4 and a magnetic tape 3 can be made to correspond in the tape cassette 1, for example, playback actuation can be restrained now.
[0125] In addition, when performing first record to the tape cassette 1, record is performed from the head of the partition of the head of a magnetic tape.
[0126] Drawing 23 is a flow chart which explains an example of processing transition of the system controller 40 in the case of performing playback actuation in the condition of having been loaded with the tape cassette 1 which a cartridge serial number is recorded on the tape streamer drive 10 by the magnetic tape 3, and is set to "WORM." If the tape streamer drive 10 is loaded with the tape cassette 1, a cartridge serial number will be first detected from the remote memory chip 4 (S101), and the cartridge serial number currently further written in the magnetic tape 3 will be detected (S102). And if for example, a playback command is supplied, for example from a host computer 40 (S103), the cartridge serial number currently recorded on the remote memory chip 4 and the magnetic tape 3 is collated (S104), and when [which was distinguished] the cartridge serial number is in agreement, control which shifts to necessary actuation of (S105, for example, playback etc.) will be performed (S106). Moreover, when the cartridge serial number was not in agreement and it distinguishes, as playback actuation is not performed, it shifts to the blowdown standby condition of the tape cassette 1 (S107).
[0127] thereby, the remote memory chip 4 exchanges in a tape cartridge 1 -- having -- other remote memory chips 4 -- **** substitute **** -- when like, it can come avoid reproducing data Therefore, since possible actuation can be restrained, for example even when other exchanged remote memory chips 4 are considered as "the general purpose", it can avoid showing the user of the exteriors other than a predetermined user the data currently recorded on the magnetic tape 3. Moreover, it can avoid now changing the data originally recorded on the magnetic tape 3 as "WORM" because it is made not to perform record actuation when the cartridge serial number is not in agreement similarly. In addition, if attached to additional record of data, you may make it make it grant a permission, when a cartridge serial number is not in agreement.
[0128] In addition, although the gestalt of the above-mentioned implementation mentioned and explained in the example the configuration in which the tape cassette 1 is equipped with the remote memory chip 44, in the tape cassette 1 by which it has the contact mold memory 104, this invention is applicable similarly.
[0129]
[Effect of the Invention] As mentioned above, the tape drive equipment of this invention reads application identification information from the memory (Media Interface Connector) with which the tape cassette is equipped, and he is trying to control the actuation to a tape cassette based on this application identification information, as explained. Only additional record from the record last location can be performed now, without this performing the overwrite and elimination to the data already recorded on the magnetic tape as for example, record actuation. Therefore, it can avoid making the existing record data change with tape drive equipment. Moreover, since he is trying to record the identification information made into the serial number of the tape cassette memorized by memory with record data etc. on a magnetic tape when recording, information common to a magnetic tape and memory can be given to a tape cassette. Furthermore, since it is made to enable only playback actuation to a magnetic tape based on application identification information, protection of record data can be realized.
[0130] Moreover, identification information which is recorded on a magnetic tape and memory, for example, is made into the serial number of a tape cassette etc. in a tape cassette as tape drive equipment of this invention is compared, and it enables it to perform specific predetermined actuation based on this comparison result. Therefore, only when the identification information of both a magnetic tape and memory is the same, the playback and record over a magnetic tape can be performed. Thereby, a magnetic tape or memory can realize protection of record data to the exchanged tape cassette.

[0131] Moreover, the application identification information the record medium of this invention instructs the application of a tape cassette to be in memory (Media Interface Connector) is memorized. Therefore, the application of the record medium concerned can be shown to the tape drive equipment with which it was loaded, and it can come to perform actuation corresponding to said application to tape drive equipment. Furthermore, since said application identification information is memorized to the field made read-only in said memory, it can avoid making the application of a record medium change by changing the content of said application identification information.
[0132] Furthermore, the identification information made into the serial number of a tape cassette etc. at memory and a magnetic tape is memorized. That is, the same information made common to memory and a magnetic tape can be memorized, and the memory and the magnetic tape with which the same tape cassette is equipped can be made to correspond now. therefore -- identification information stops for example, being in agreement with the tape cassette of others [memory] a **** substitute **** case In such a case, with tape drive equipment, by giving constraint to record and playback actuation, for example, it is made not to make record data indicate, or it becomes possible not to be made not to perform elimination for record data to change, overwrite actuation, etc.

[Translation done.]